

Claims

- [c1] 1. A method for controlling the rotational speed of a turbogenerator operating in stand-alone mode to account for a present operating load on said turbogenerator and a transient reserve capability, comprising the steps of:
 receiving a base speed set point for said turbogenerator;
 determining a speed offset comprising an adjustment to said base speed set point required to accommodate the present operating load and the transient reserve capability;
 determining an adjusted speed set point by combining said speed offset with said base speed set point; and
 setting the rotational speed of said turbogenerator to said adjusted speed set point.
- [c2] 2. The method of claim 1, wherein said base speed set point comprises a constant baseline speed setting for said turbogenerator.
- [c3] 3. The method of claim 1, wherein said base speed set point comprises a baseline speed setting for said turbogenerator calculated based on ambient conditions of said turbogenerator.
- [c4] 4. The method of claim 1, wherein determining said speed offset comprises the steps of:
 receiving a sensor feedback signal indicating the present operating load of said turbogenerator;
 determining the transient reserve capability of the turbogenerator based on the present operating load and the operational limits; and
 consulting a look-up table.
- [c5] 5. The method of claim 1, wherein determining said speed offset comprises the steps of:
 receiving a sensor feedback signal indicating the present operating load of said turbogenerator;
 determining the transient reserve capability of the turbogenerator based on the present operating load and operational limits; and
 calculating said speed offset using at least one mathematical function.

- [c6] 6. The method of claim 1, further comprising the step of filtering the adjusted speed set point using an engine dynamics filter; and wherein the step of setting the rotational speed of the turbogenerator comprises setting the rotational speed to the filtered speed set point.
- [c7] 7. The method of claim 6, further comprising the step of trimming the filtered speed set point.
- [c8] 8. The method of claim 7, wherein trimming the filtered speed set point prevents said turbogenerator from exceeding operational limits.
- [c9] 9. The method of claim 7, wherein trimming the filtered speed set point optimizes the operation of the turbogenerator to increase efficiency.
- [c10] 10. The method of claim 7, wherein trimming the filtered speed set point preserves a reserve temperature margin to account for transient reserve loads.
- [c11] 11. The method of claim 7, wherein trimming the filtered speed set point comprises:
calculating a trim signal based on a sensor feedback signal that indicates an operating parameter selected from the group consisting of speed, load, temperature, and pressure; and
combining the trim signal with the filtered speed set point.
- [c12] 12. The method of claim 1, further comprising the step of trimming the adjusted speed set point; and wherein the step of setting the rotational speed of the turbogenerator comprises setting the rotational speed to the trimmed speed set point.
- [c13] 13. The method of claim 12, wherein trimming said adjusted speed set point preserves a reserve temperature margin to account for the transient reserve capability.
- [c14] 14. The method of claim 12, wherein trimming the adjusted speed set point prevents said turbogenerator from exceeding operational limits.
- [c15] 15. The method of claim 12, wherein trimming the adjusted speed set point

optimizes the operation of the turbogenerator to increase efficiency.

- [c16] 16. The method of claim 12, wherein trimming said adjusted speed set point comprises:
- calculating a trim signal based on a sensor feedback signal that indicates an operating parameter selected from the group consisting of speed, load, temperature, and pressure; and
- combining the trim signal with the adjusted speed set point.
- [c17] 17. The method of claim 1, wherein setting the rotational speed of said turbogenerator comprises:
- determining a speed command error by subtracting the actual rotational speed of said turbogenerator from said adjusted speed set point; and
- inputting said speed command error to a speed control algorithm for controlling a flow control valve.
- [c18] 18. A method for controlling the rotational speed of a turbogenerator operating in stand-alone mode to account for a present operating load and a transient reserve capability, comprising the steps of:
- receiving a base speed set point for said turbogenerator;
- determining a speed offset comprising an adjustment to said base speed set point required to accommodate said present operating load and said transient reserve capability;
- determining an adjusted speed set point by combining said speed offset with said base speed set point;
- trimming the adjusted speed set point; and
- setting the rotational speed of said turbogenerator to the trimmed speed set point.
- [c19] 19. The method of claim 18, wherein said base speed set point comprises a constant baseline speed setting for said turbogenerator.
- [c20] 20. The method of claim 18, wherein said base speed set point comprises a baseline speed setting for said turbogenerator based on ambient conditions of said turbogenerator.

- [c21] 21. The method of claim 18, wherein determining said speed offset comprises the steps of:
receiving a sensor feedback signal indicating the present operating load of said turbogenerator;
determining the transient reserve capability of the turbogenerator based on the present operating load; and
consulting a look-up table.
- [c22] 22. The method of claim 18, wherein trimming said adjusted speed set point comprises:
calculating a trim signal based on a sensor feedback signal that indicates an operating parameter selected from the group consisting of speed, load, temperature, and pressure; and
combining the trim signal with the adjusted speed set point.
- [c23] 23. The method of claim 18, wherein trimming said adjusted speed set point prevents said turbogenerator from exceeding operational limits.
- [c24] 24. The method of claim 18, wherein trimming said adjusted speed set point optimizes the operation of the turbogenerator to increase efficiency.
- [c25] 25. The method of claim 18, wherein trimming said adjusted speed set point preserves a reserve temperature margin to account for said transient reserve capability.
- [c26] 26. The method of claim 18, further comprising the step of filtering said adjusted speed set point with an engine dynamics filter prior to trimming.
- [c27] 27. The method of claim 18, wherein setting the rotational speed of said turbogenerator comprises:
determining a speed command error by subtracting the actual rotational speed of said turbogenerator from said trimmed speed set point; and
inputting said speed command error to a speed control algorithm for controlling a flow control valve.
- [c28] 28. A system for controlling the rotational speed of a turbogenerator operating

in stand-alone mode to account for a present operating load and a transient reserve capability comprising:

a sensor for generating a sensor feedback signal indicating the present operating conditions of the turbogenerator, wherein the operating conditions are selected from the group consisting of speed, load, temperature, and pressure;

a flow control valve for controlling an amount of fuel supplied to a combustor, said combustor producing hot expanding gases used to rotate a turbine;

a controller functionally connected to the sensor and to the flow control valve for receiving the sensor feedback signal from the sensor and for sending a command to the flow control valve; and

wherein the controller executes computer-executable instructions for performing the steps comprising:

receiving a base speed set point for said turbogenerator;

determining a speed offset comprising an adjustment to said base speed set point required to accommodate the present operating load and the transient reserve capability;

determining an adjusted speed set point by combining said speed offset with said base speed set point; and

generating the command for instructing the flow control valve to regulate the amount of fuel that is supplied to the combustor such that the rotational speed of said turbogenerator is set to said adjusted speed set point.

[c29] 29. The system of claim 28, wherein said base speed set point comprises a constant baseline speed setting for said turbogenerator.

[c30] 30. The system of claim 28, wherein said base speed set point comprises a baseline speed setting for said turbogenerator based on ambient conditions of said turbogenerator.

[c31] 31. The system of claim 28, wherein determining said speed offset comprises:
receiving the sensor feedback signal indicating the present operating load of said turbogenerator;
determining the transient reserve capability of the turbogenerator based on the

capability.

- [c38] 38. The system of claim 34, wherein trimming said adjusted speed set point prevents said turbogenerator from exceeding operational limits.
- [c39] 39. The system of claim 34, wherein trimming said adjusted speed set point optimizes the operation of the turbogenerator to increase efficiency.
- [c40] 40. The system of claim 34, wherein setting the rotational speed of said turbogenerator comprises:
determining a speed command error by subtracting the actual rotational speed of said turbogenerator from said adjusted speed set point; and
inputting said speed command error to a speed control algorithm for controlling a flow control valve.